

generate data defining a polygon mesh representing the surface shape of the subject object;

defining a plurality of texture map images, each representing a view of the polygon mesh from a respective viewing direction;

processing the polygon mesh and the texture map images to test the visibility of the polygons in the texture map images and to generate, in dependence thereon:

data defining the polygons in the mesh for which the visibility in each texture map image is less than a threshold; and

data defining texture coordinates in a texture map image for each other polygon in the polygon mesh;

generating texture data for each texture map image in dependence upon the image data, and storing the generated data as texture maps for the polygon mesh; and

generating texture data for the identified polygons in the mesh for which the visibility in each texture map image is less than the threshold in dependence upon the image data, and storing the generated texture data as at least one further texture map for the polygon mesh.

42. (New) A method according to claim 41, wherein, in the processing to test the visibility of the polygons in the texture map images, each polygon is tested to determine the proportion thereof which is visible in a texture map image.

43. (New) A method according to claim 42, wherein each polygon is tested to determine the proportion thereof which is visible in a texture map image by:

rendering an image of the polygon mesh into the texture map image using Z-buffering to generate pixel values and depth data for each pixel;

rendering the polygon to be tested into the texture map image in a first colour

without using Z-buffering, thereby changing the existing pixel values but not the existing depth data; and

rendering the polygon to be tested into the texture map image in a second colour using Z-buffering, thereby to change the existing pixel values.

44. (New) A method according to claim 41, wherein, in the processing to test the visibility of the polygons in the texture map images, polygons are tested in dependence upon their respective angles with the texture map images.

Q. 45. (New) A method according to claim 41, wherein six texture map images are defined, the six texture map images comprising views of the subject object from the six faces of a cuboid enclosing the subject object.

46. (New) A method according to claim 41, further comprising compressing the data defining the texture maps and the further texture map.

47. (New) A method according to claim 41, further comprising outputting a signal defining the texture maps and the further texture map.

48. (New) A method according to claim 47, further comprising making a recording of the signal either directly or indirectly.

S.S B. } 49. (New) An image processing apparatus operable to process image data defining a plurality of images of a subject object recorded at different positions relative thereto

and data defining the relative positions of the images, to generate data defining a three-dimensional computer surface shape model of the subject object and texture maps defining texture data for the surface shape model, the apparatus comprising:

a polygon mesh generator operable to process the image data and the data defining the relative positions to generate data defining a polygon mesh representing the surface shape of the subject object;

a texture map image generator operable to generate data defining a plurality of texture map images, each representing a view of the polygon mesh from a respective viewing direction;

a visibility tester operable to process the polygon mesh and the texture map images to test the visibility of the polygons in the texture map images and to generate, in dependence thereon:

data defining the polygons in the mesh for which the visibility in each texture map image is less than a threshold; and

data defining texture coordinates in a texture map image for each other polygon in the polygon mesh; a texture generator operable to:

a first texture data generator operable to generate texture data for each texture map image in dependence upon the image data, and to store the generated data as texture maps for the polygon mesh;

a second texture data generator operable to generate texture data for the identified polygons in the mesh for which the visibility in each texture map image is less than the threshold in dependence upon the image data, and to store the generated texture data as at least one further texture map for the polygon mesh.

50. (New) Apparatus according to claim 49, wherein, the visibility tester is operable to test each polygon to determine the proportion thereof which is visible in a texture map image.

51. (New) Apparatus according to claim 50, wherein the visibility tester is operable to test each polygon to determine the proportion thereof which is visible in a texture map image by:

rendering an image of the polygon mesh into the texture map image using Z-buffering to generate pixel values and depth data for each pixel;

Q1 rendering the polygon to be tested into the texture map image in a first colour without using Z-buffering, thereby changing the existing pixel values but not the existing depth data; and

rendering the polygon to be tested into the texture map image in a second colour using Z-buffering, thereby to change the existing pixel values.

52. (New) Apparatus according to claim 49, wherein, the visibility tester is operable to test polygons in dependence upon their respective angles with the texture map images.

53. (New) Apparatus according to claim 49, wherein the texture map image generator is operable to define six texture map images, the six texture map images comprising views of the subject object from the six faces of a cuboid enclosing the subject object.

54. (New) Apparatus according to claim 49, further comprising a data compressor operable to compress the data defining the texture maps and the further texture map.

55. (New) An image processing apparatus operable to process image data defining a plurality of images of a subject object recorded at different positions relative thereto and data defining the relative positions of the images, to generate data defining a three-dimensional computer surface shape model of the subject object and texture maps defining texture data for the surface shape model, the apparatus comprising:

means for processing the image data and the data defining the relative positions to generate data defining a polygon mesh representing the surface shape of the subject object;

means for generating data defining a plurality of texture map images, each representing a view of the polygon mesh from a respective viewing direction;

means for processing the polygon mesh and the texture map images to test the visibility of the polygons in the texture map images and to generate, in dependence thereon:

data defining the polygons in the mesh for which the visibility in each texture map image is less than a threshold; and

data defining texture coordinates in a texture map image for each other polygon in the polygon mesh;

means for generating texture data for each texture map image in dependence upon the image data, and for storing the generated data as texture maps for the polygon mesh; and

means for generating texture data for the identified polygons in the mesh for which the visibility in each texture snap image is less than the threshold in dependence upon the image data, and for storing the generated texture data as at least one further texture map for the

polygon mesh.

56. (New) A storage medium storing instructions for programming a programmable processing apparatus to become operable to process image data defining a plurality of images of a subject object recorded at different positions relative thereto and data defining the relative positions of the images, to generate data defining a three-dimensional computer surface shape model of the subject object and texture maps defining texture data for the surface shape model, the instructions comprising instructions for programming the programmable processing apparatus to become operable to:

process the image data and the data defining the relative positions to generate data defining a polygon mesh representing the surface shape of the subject object;

define a plurality of texture map images, each representing a view of the polygon mesh from a respective viewing direction;

process the polygon mesh and the texture map images to test the visibility of the polygons in the texture map images and to generate, in dependence thereon:

data defining the polygons in the mesh for which the visibility in each texture map image is less than a threshold; and

data defining texture coordinates in a texture map image for each other polygon in the polygon mesh;

generate texture data for each texture map image in dependence upon the image data, and to store the generated data as texture maps for the polygon mesh; and

generate texture data for the identified polygons in the mesh for which the visibility in each texture map image is less than the threshold in dependence upon the image data, and to store the generated texture data as at least one further texture map for the polygon mesh.

57. (New) A signal carrying instructions for programming a programmable processing apparatus to become operable to process image data defining a plurality of images of a subject object recorded at different positions relative thereto and data defining the relative positions of the images, to generate data defining a three-dimensional computer surface shape model of the subject object and texture maps defining texture data for the surface shape model, the instructions comprising instructions for programming the programmable processing apparatus to become operable to:

process the image data and the data defining the relative positions to generate data defining a polygon mesh representing the surface shape of the subject object;

define a plurality of texture map images, each representing a view of the polygon mesh from a respective viewing direction;

*Q1* process the polygon mesh and the texture map images to test the visibility of the polygons in the texture map images and to generate, in dependence thereon:

data defining the polygons in the mesh for which the visibility in each texture map image is less than a threshold; and

data defining texture coordinates in a texture map image for each other polygon in the polygon mesh;

generate texture data for each texture map image in dependence upon the image data, and to store the generated data as texture maps for the polygon mesh; and

generate texture data for the identified polygons in the mesh for which the visibility in each texture map image is less than the threshold in dependence upon the image data, and to store the generated texture data as at least one further texture map for the polygon mesh.